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The subsections are distinguished by the position of the resinous ducts within the leaf. These ducts, normally two, but very often numerous, lie amid the chlorophyll-bearing parenchyma cells, between the thick epidermis and the sheath which surrounds the vascular bundles. When close to the epidermis the ducts are called *peripheral ;* surrounded on all sides by the parenchyma, *parenchymatous ;* close to the sheath around the vascular bundles, *internal* ducts. The use of this position of the ducts is the main new point in the present classification. It is believed to be constant and intimately connected with the essential character of the plant. The difficulties attendant upon its use are : *first*, that " in some few species smaller accessary ducts do occupy an abnormal position ; *secondly*, that " in pines with very slender leaves it is sometimes difficult to discover the ducts," and in some forms perhaps they are really absent, especially in cultivated specimens ; and, *thirdly*, that sometimes the parenchyma separating them from the epidermis or vascular sheath is so thin a layer that *parenchymatous* ducts may be mistaken for *peripheral* or *internal.* The other distinctions though mostly more obvious are less natural, only the presence or absence of hypodermal or strengthening cells is difficult of appreciation and of doubtful value. We proceed to give a somewhat abridged account of the arrangement, but of course the students of pines will not be satisfied with less than the complete monograph with all its details. Dr. Engelmann includes only such species or (sub-species) as he has been able to examine himself : " the list, however, will be found nearly complete." The numbers prefixed to the species are additions of our own.

SECT. I. STROBUS.

§ 1. **Eustrobi.**—Ducts peripheral. Northern or mountain species of the Old and New World.

* Wings longer than the seed.

1. P. Strobus, 2. monticola, 3. excelsa, 4. Peuce, 5. parviflora, 6. Bonapartea, 7. Ayacahuite, 8. Lambertiana.

** Wings much shorter than seeds.

9. P. flexilis, (10. albicaulis), 11. pygmaea.

§ 2. **Cembrae.**—Ducts parenchymatous—Europe and principally Asia.

12. P. Cembra, 13. Mandschurica, 14. Koraiensis.

SECT. II. PINASTER.

A. Ducts peripheral. *a.* Cones subterminal.

§ 3. **Integrifoliae.**—Leaves smooth-edged, their sheaths deciduous.—Western North America and Mexico.

* Cones short globose ; scales unarmed ; seeds large with a minute wing.—*Cembroides.*

15. P. Parryana, 16. cembroides, 17. edulis, 18. monophylla.

** Cones oval or elongated; scales armed; seeds much shorter than the wing.—*Balfouriana.*

19. P. Balfouriana, (20. artistata.)

§ 4. **Sylvestres.**—Leaves serrulate, their sheaths persistent.—Europe and Asia, one species in America.

* Leaves in threes.—*Indicae.*

21. P. Khasia, 22. insularis, 23. longifolia.

** Leaves in twos. Cones and seeds small; wings large.—*Eusylvestres.*

24. P. sylvestris, 25 montana, 26. resinosa, 27. densiflora, 28. Massoniana, 29. ? Merkusii.

*** Leaves in twos. Cones and seeds large; wings rudimentary. A single Mediterranean species.

30. P. Pinea.

b. Cones lateral.

§ 5. **Halepenses.**—Old World.

* Leaves in threes; sheaths deciduous; umbo very prominent; wings shorter than the large seeds. *Gerardianae.*—Asia.

31. P. Gerardiana, 32. Bungeana.

** Leaves in twos; sheaths persistent; cones smoothish; wings much longer than seeds. *Euhalepenses.*—Mediterranean regions.

33. P. Halepensis, 34. Pyrenaica.

B. Ducts parenchymatous. *a.* Cones subterminal.

§ 6. **Ponderosae.**—Mostly American with three Old World species.

* Leaves in fives; ducts usually free of strengthening cells; *Pseudostrobi.*—Central America and Mexico to Arizona and California.

35. P. leiophylla, 36. tenuifolia, 37. filifolia, 38. Pseudo-Strobus, 39. Montezumae, (40. Hartwegii), 41. Torreyana, 42. Arizonica.

** Leaves in threes, sometimes in fours or fives; sheaths persistent; strengthening cells under the epidermis, around ducts. *Euponderosae.*—Northwestern America, Mexico and Canary Islands.

43. P. Engelmanni, 44. ponderosa, (45. Jeffreyi), 46. Canariensis.

*** Leaves in threes; sheaths deciduous.—Mexico and Arizona.

47. P. Chihuahuana.

**** Leaves in twos. *Lariciones.*—Europe to Asia and W. America.

48. P. Laricio, (49. Austriaca), 50. Thunbergii, 51. contorta, (52. Murrayana.)

b. Cones lateral.

§ 7. **Taedae.**—Mostly American, only one Old World species.

*. Leaves in threes. *Eutaedae.*—North America to Mexico.

53. P. Sabiniana, 54. Coulteri, 55. insignis, 56. tuberculata. 57. Taeda, 58. rigida, (59. serotina), 60. Greggii. 61. Teocote. 62. patula.

** Leaves in twos; cones with very stout prickles. *Pungentes.*

† Ducts without strengthening cells.—North America.

63. P. inops, (64. clausa), 65. pungens, 66. muricata.

†† Ducts surrounded by strengthening cells.—Southern Europe.

67. P. Pinaster.

*** Leaves in twos, or in the first often also in threes; cones with weak or deciduous prickles. *Mites.*—Eastern North America.

68. P. mitis, 69. glabra, 70. Banksiana.

c. Ducts internal.

§ 8. **Australes.**—Leaves in twos to fives. Timber very heavy and resinous.—Southeastern North America, West Indies, and one species in Mexico.

* Cones subterminal; leaves in threes to fives. *Euaustrales.*

71. P. oocarpa, 72. occidentalis, 73. australis.

** Cones lateral or mostly so; leaves in twos to threes. *Elliottiae.*

74. P. Elliottii, 75. Cubensis, 76. Wrightii.

Notes.

Nos. 15–18. *Cembroides.* Dr. Englemann considers it an open question whether these four species may not properly be united into one.—19, 20 must be united.—21–23. a very natural group.—27. *P. densiflora*, Sieb. & Zucc., sometimes cultivated under the name of the following.—28. *P. Massoniana*, Lamb. Parlat., not Sieb. & Zucc., or Endlich., that is No. 50, *P. Thunbergii*, Parl.—29. *P. Merkusii*, Jungh. & De Vriese, with poor specimens the affinity of this species was not certainly determined.—34. *P. Pyrenaica.* Lapeyr. fide Parlatore, not to be confounded with 48, *P. Laricio*, Poir., as has been done, even by Lapeyrouse himself.—39. *P. Montezumae*, Lamb., species not sufficiently circumscribed.—43. *P. Engelmanni*, Carrière. Wislizenus brought a single specimen from the mountains west of Chihuahua.—46. *P. Canariensis*, Ch. Smith, perhaps more nearly related to *P. Laricio*, Poir. The articulation of the four involucral bracts is a curious feature which it has in common with our *P. resinosa*, Ait.—53. *P. Murrayana*, Balf., is only a broader leaved mountain form of *P. contorta*, Doug,—56. *P. tuberculata*, Gordon, not of Don, which is a form of *P. insignis*, Doug.—67. *P. Pinaster*, Ait., except by the position of the female ament, more nearly allied to *P. Canariensis*, less so to *P. Laricio.*—74. *Pinus Elliotti*, Engelm., imperfectly known to Elliott, was rediscovered about ten years ago by Dr. Mellichamp, and is here fully described and illustrated.

§ 35. **Fresh Water Algae, IV.**

The pursuit of my recreation, the natural history of Fresh Water Algae, has revealed to me, during the past year, new points of interest in the development and growth of a few, and brought to light, out of their hitherto hidden abiding places, many which previously had not been recorded as dwelling in our land.

The following list of upwards of one hundred plants, embraces at least ninety which are new to the United States Flora, and of which eighteen were wholly unknown. About fifty were collected in New Jersey. This State, which has won a wide reputation for its peculiar richness in phenogamous plants, also appears in the small portion thus far explored, to be richly stocked with cryptogams.

When the locality is not given in the list, it is to be understood that the plant was found in the vicinity of Bethlehem, Pa. Some were collected in the neighborhood of New York, and others in Massachusetts, Connecticut, Iowa, Florida, etc.

To the collectors whose names are mentioned, I return cordial thanks, alike for what they have done, and for their promises of further favors. I am happy also in having several new volunteers, who await the opening of the season to begin their explorations. To O. Nordstedt, of Lund, Sweden, I am especially indebted for valuable suggestions, and for many desirable extracts from his extensive library of botanical works. FRANCIS WOLLE.

BETHLEHEM, PA., March, 1880.

PHYCOCHROMOPHYCEAE.

Oscillaria, Bosc.—O. subfusca, Vauch. Wet gneiss rocks.—O. Porettana, Menegh. Shaded limestone rocks.—O. tenuis, Ag. Dripping rocks. O. Grateloupii, Bory. Submarine waters, New York. Coll. R. Hitchcock.—O. subsalsa, Ag., *var.* dulcis, Ktz. Antigua, W. I. Coll. B. Romig.—O. natans, Ktz. Ponds, New Jersey.—O. Froellichii, *var.* phormidioides, Rabenh. Swartwout Lake, &c., New Jersey.

Phormidium, Ktz.—P. arenarium, Ag. Florida. Coll. J. D. Smith.